

REMARKS

The Applicant appreciates the Examiner's thorough review of the application.

Reconsideration and allowance of all claims are respectfully requested.

No new matter has been added by this amendment. Claims 1 – 9 have been amended to correct the formal matters noted by the Examiner and to overcome the rejections under 35 U.S.C. § 112. Claim 10 incorporates subject matter canceled from Claim 4.

Claims 1 – 3, 6, and 8 are patentable under 35 U.S.C. 102(b) over Swatty (U.S. Patent 3,737,254)

Firstly it should be acknowledged that the two constructions (Swatty vs. the present invention) are significantly different. Swatty differs from the present invention, for example, in the following ways:

1. The present invention has one operational chamber, ref. 29, where the '254 has three operational chambers, ref. 12 and cylinder 4 and cavity 23.

2. As is evident from the description of the operation of the present invention, see in particular the description on pages 12-14, it is important and evident that the wording "interacting" for describing the relationship between the high pressure piston and the low pressure piston does not include "connected" as stated by the examiner.

3. The examiner finds that a change over valve is coaxially arranged in the cylinder. In the present invention the change over valve is provided in the sole operational chamber 29, whereas in Swatty the valve is provided in the cavity 12 (corresponding to an operational chamber).

4. The further arrangement of a spring coaxially around an impulse rod is also not present in Swatty. There are possibly two springs in Swatty, a first spring 29 arranged in the cavity 23 (operational chamber). This spring is coaxially arranged around the pumping piston. The other spring in Swatty comprises a number of segments which are arranged in the cavity 12 (another operational chamber) for manipulating the sleeve 55.

5. The examiners construction/recognition of a locking member in Swatty comprising the spring 57 and the pin 67 in the slot 66, has no locking capability, is not designed to lock, nor are the features comparable to the locking arrangement according to the present invention.

6. The alternating movement in the last part of the claim is also different in Swatty as compared to the present invention. Swatty does not have a low pressure connection including a check valve, for having low pressure fluid pushing the high pressure piston into contact with the low pressure piston, thereby driving the low pressure piston back.

These differences are not merely design choices. Basically, the construction according to Swatty provides for a very short travel of the valve which in turn requires a larger volume, by means of a larger diameter of the cylinder in which the valve operates. This larger size is in most applications a serious drawback, as it limits the practical use of such devices, when incorporated into complex hydraulic constructions, such as for example inside the arm of a digging machine or the like.

Furthermore the valve in Swatty constantly follows the low pressure piston, and due to the integral construction also the high pressure piston. This in turn does not provide for so-called lost motion. The Swatty construction has radially arranged springs (ref. 57) to control this movement, whereas the present invention due to the separate nature of the two pistons, the

impulse rod and the coaxially arranged spring utilises this lost motion, by letting the valve slide during the pistons movements.

In Swatty the pin 66 and slot 67 maintain the valve in position relative to the piston until the valve is in a position where the radial springs 57 snaps from one rest position to another rest position, thereby instantaneously flipping the valve from one position to the other. The pin 66 and slot 67 therefore are provided as movement limiters, assuring that the valve remains in one of its two positions.

It shall also be noted that on the return stroke when the volume of fluid in the operational chamber behind the low pressure piston has to be replaced, the Swatty device drains this fluid to the reservoir 21, whereas the present invention by means of the channels 20, maintains the fluid inside the device.

According to the present invention transfer of force is provided by engagement of "engagement surfaces". These surfaces are provided between the impulse rod and the low pressure piston, and the impulse rod and the high pressure piston. Exactly the separate construction of high and low pressure pistons respectively and the impulse rod provides for the possibility of relative sliding movement of the parts, such that lost motion may be converted to better efficiency. The Swatty construction, by means of the low pressure piston, being the only part influenced by the fluid pressure, needs to replace/move large amounts of fluid in order for the actuator to work.

The present invention, however has low pressure fluid on the high pressure piston by means of the low pressure connection 6 (see fig 1), in this manner the lost motion is stored in the springs and the fluid, and actively helps the pistons to alter direction.

The locking mechanism, also activated by low pressure fluid working on the high pressure piston, forcing the piston backwards, thereby compressing the coaxially arranged spring 10 eventually overcomes the locking force provided by the spring body 4.

It should also be noted that an underlying aspect of the invention as discussed extensively in the application is the limitation on mass which has to be moved in order to produce the required amount of high pressure. The less weight/mass and fluid which has to move, the less energy is needed, and the more energy is left over for actually producing high pressure.

Furthermore for maintenance purposes, the fewer moving parts the less wear.

A further feature making this possible is the provision of the channel 20 in the valve 19. This channel makes it possible to only have one operational chamber 29, which in combination with the separate construction of the pistons and the impulse rod provides sufficient long stroke, for the construction to remain light and slim.

As a result of these different constructions, several limitations of Claim 1 are not taught or suggested by Swatty. For an invention to be anticipated, it must be demonstrated that each and every element of the claimed invention is present in the "four corners" of a single prior art, either expressly described therein or under the principle of inherency. Lewmar Marine Inc. v Barient Inc., 3 USPQ2d 1766, 1767-1768 (Fed. Cir. 1987) (emphasis added). The absence from Crucible, Inc., 230 USPQ 81, 84 (Fed. Cir. 1986). As explained above, Swatty does not teach or suggest at least a high pressure piston interacting with a low pressure piston, at least one spring coaxially around an impulse rod, a locking mechanism, and that the impulse rod (24) via impulse spring (10,36) and mechanical stops (8,9,22,23,25) in the end position releases the locking

mechanism (3, 35) whereby the valve shifts and the low pressure medium, via the low pressure connection (6) via a check valve (11), presses the high and low pressure pistons back.

In conclusion it is evident that the differences listed above, explicitly derivable from an objective analysis of the invention as defined in independent claim 1 in comparison to the prior art as suggested in US 3,737,254 renders the subject matter of claim 1 novel. For at least the above reasons, the rejection of Claims 1 – 3, 6, and 8 under 35 U.S.C. 102(b) over Swatty is improper and should be withdrawn.

Claim 7 is patentable under 35 U.S.C. 103(a) over Swatty (U.S. Patent 3,737,254) in view of Sutherland (U.S. Patent 4,622,992)

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added).

Claim 7 depends from Claim 1, shares its patentable features, and adds further patentable limitations. Sutherland does not supply what is lacking in Swatty as noted above. For at least the above reasons, the rejection of Claim 7 under 35 U.S.C. 103(a) over Swatty in view of Sutherland is improper and should be withdrawn.

Claims 1 - 6 and 8 - 9 are patentable under 35 U.S.C. 103(a) over Isamu et al. (Japanese Patent Application 2000-87906) in view of Swatty (U.S. Patent 3,737,254)

Isamu does not provide what is lacking in Swatty. Indeed, the Examiner admits that Isamu does "not teach that in connection with the valve there is arranged at least one spring coaxially around the impulse rod." For at least that reason, Claim 1 is patentable over Isamu in view of Swatty. Furthermore, the translation of Isamu is poor and the conclusions drawn by the Examiner with regards to Isamu do not appear to be supported.

For example, the Examiner argues that elements 6 and 7 are high pressure pistons and high pressure producers. However, the translation describes elements 6 and 7 as "high voltage birth parts." This appears to contradict the Examiner's interpretation of these elements. The Examiner argues that Isamu teaches a second operational area of the same size or less than the first operational area because "end surfaces (2a and 2b) of the pistons are smaller than the flange (21)." However, a comparison of front end surface 2a and back end side 2b of a spool 2 with the size of a flange 21 does not appear to relate to the sizes of operating areas.

Introductory port 4 is described by the Examiner as a "low pressure area", which appears to have no textual support, and argues that it communicates with front part pressure introduction room 5b, which the Examiner describes as an operational chamber. This interpretation does not appear to be supported. Sleeve 19 is described by the Examiner as a changeover valve. None of this is apparent from the reference.

In addition, the Examiner asserts that numerous elements are taught by Isamu without giving any reference numbers or means for identifying the alleged components. For example, the impulse rod, low pressure connection, and check valve are not identified. Without this

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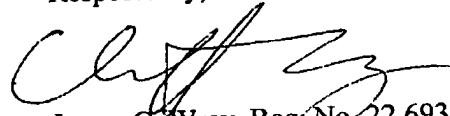
information, applicant is unable to determine Examiner's basis for the rejection of each of the claims.

Claims 2 – 6 and 8 – 9 depend from Claim 1, share its patentable features, and add further patentable limitations. For at least these reasons, the rejection of Claims 1 – 6 and 8 – 9 under 35 U.S.C. 103(a) over Isamu in view of Swatty is improper and should be withdrawn.

CONCLUSION

Reconsideration and allowance of all claims are respectfully requested.

Respectfully,



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